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## BRAINMAPPING PROJECT

*by F. Holmes Atwater*

*F. Holmes (Skip) Atwater has been a college instructor, scientific investigator and behavioral engineer. He specializes in the design and application of methods for developing advanced human potentials. He has been a technical consultant to The Monroe Institute since 1977.*

Updating his professional paper of last year, Fred "Skip" Atwater outlined TMI's current and ambitious research project for the physiological monitoring of consciousness—the Brainmapping Project. Specifically, the new sophisticated computerized equipment will provide data for high resolution color topographic mapping of the electrical activity of the cerebral cortex, skin potential voltage (PVR), galvanic skin response (GSR), and peripheral temperature. Until now, Explorer lab sessions only provided GSR readings.

Skip provided an overview of the types of brain wave monitoring, telling how Electroencephalographs (EEGs) use 16 channels to graph the frequency and amplitude of different areas of the brain's cortical electrical activity. However, due to unwieldy amounts of paper required to accumulate data and the limited capacity to interpret and communicate these results, EEGs pose a ready-made problem for research. He also mentioned the "Mind Mirror," which uses light emitting diodes (LEDs) to track and record cortical electrical activity by presenting a lighted bar graph of the brain's right and left hemispheres. The problem here, he mentioned, is that the Mind Mirror computes only 4 channels and thus offers averages rather than specific readings.

By contrast, TMI's new system will monitor 20 channels, allowing one to quickly assess many variations of frequency, amplitude, and electrode location, as well as allowing one to monitor these variations in different time periods. Moreover, these can be monitored on a video display terminal by viewing graphs similar to EEG tracings, or by viewing color pictures that represent the frequencies and electrode locations, or both simultaneously.

This process of Brain Electrical Activity Mapping (BEAM) was developed circa 1982 by Dr. Frank Duffy of Children's Hospital Medical Center in Boston, and David Culver of Braintech, a manufacturing company in New Jersey. The computer software has been tailored for TMI to indicate frequencies lower than 4 hertz, and to indicate phase relationships between electrodes. This will result in improved Hemi-Sync® tapes, a more efficient use of frequencies, and the ability to tailor Hemi-Sync tones for specific individual use.

Skip told how he hoped the hard data might stimulate doctors, dentists, and other professionals to view BEAM for its practical applications. He also hopes this pilot study will seed the imagination of academia so they will strive to replicate these studies.

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